The influence of stress and satisfaction on productivity

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Abstract

In this study, using a random sample of 425 employees in the private and public sector, we investigate the effects of stress and job satisfaction on the functioning of a company. Our attention is focused on factors that affect stress and job satisfaction like the number of work hours, good relations between management and employees, good function of the group and work related to employees' area of education. Factor Analysis is used first in order to identify the responsible factors for the correlation among a large number of qualitative and quantitative variables and their influence on productivity. The extracted factors showed us that productivity is an element affected by the two qualitative factors, stress and satisfaction. Increased stress leads to reduced productivity and increased satisfaction leads to increased productivity. Logistic Regression is used next presenting us with a lot of useful elements concerning the function of stress, satisfaction and supportive elements on productivity.

Keywords: Stress; satisfaction; productivity.

JEL classification codes: J01, J08, J81, M12, M50.

1. Introduction

Two important problems that modern organizations are faced with are stress and job satisfaction of their employees. At a first look we could deduce that these two problems are not correlated. But if we look at these issues in depth we see that one affects the other and if both function well it could lead to positive results for employees' work and organization.

Stress can be considered as an unpleasant emotional situation that we experience when requirements (work-related or not) cannot be counter-balanced with our ability to resolve them. This results in emotional changes as a reaction to this danger. It stems from the relationship between a person and its environment and it appears as pressure that is subjective because the same stressors can affect one person but not another. When an employee can manage the pressures of the job and the possibility to complete a task is substantial then stress can work as a motivating factor.

Satisfaction is a regulating factor for stress. Theories during the neo-classical period (1920-1950) supported that employee satisfaction directly affects productivity. They believed that there existed a cause-effect relationship between satisfaction and productivity. This was the reason why organizations used various means in order to increase employee productivity and thus increase productivity.

There is no doubt that in many cases productivity has to do with factors which are external to the person, but affect performance (e.g. the performance of a salesperson is closely linked with market mobility, despite the persuasion dynamics he/she may possess). In many cases, also, work performance of an individual is directly linked to the

performance of other employees in the same space, so the individual cannot set his/her own standards, especially if there are some informal social rules.

It is believed that job satisfaction is directly correlated with the mental health of the workforce and the organizations' interest in high productivity and a stable, permanent workforce. Stress on the other hand is the main cause of problems not only in persons' professional but also in their personal lives. It can also create physical and psychosomatic symptoms. A stress-filled employee makes wrong decisions and has negative relationships with coworkers. Both these elements can bear a negative outcome in the productivity of a group thus creating an added cost to a company. Reduced productivity, mistakes, low quality work, absenteeism are signs of a stressed employee.

On the other hand a satisfied employee is a vital prerequisite for a healthy company. Work related stress is a vital factor to job satisfaction. When it functions as a motivator then it results in creativity and satisfaction and consequently dissolves boredom and mundane. When stress functions as a negative factor it results to aggression and in low job satisfaction. Job satisfaction can lead to prevention of stressors though job incentives.

In this study our effort focuses on the investigation and analysis of the effect of the quality factors of stress and satisfaction on productivity. Using two-stage cluster sampling and a random sample of 425 employees in the private and public sector we extract two factors representing stress and job satisfaction and we investigate their effects on the functioning of a company and/or organizations. We focus our attention on creativity, group activity and independent work, factors that affect stress and job satisfaction. Here, the state of stress is a result of the interaction of the environment's

demands with the personal characteristics. Specifically, factors affecting creativity and productivity are the number of work hours, good relations between management and employees, good function of the group and work related to employees' area of education. Independent work increases job satisfaction and productivity of a person. It works as reducing stress.

The structure of the paper is the following. Section 2 reviews the existing relative literature. Section 3 presents the sampling framework and the adopted methodologies for the analysis of the data collected. Next the empirical results derived are presented and discussed. The last section concludes the paper and comments on the policy implications of our empirical findings.

2. Existing studies in the literature

Many attempts have been made to interpret and define stress. The first theory on stress belongs to Freud (1978), who considered stress as the result of reduced discharge of libidinal energy, either due to external obstacles or due to internal ones. In the 1960s, the cognitive approach to the personality was created, which considers that stress is created when the individual is not capable or believes that he/she is not capable of meeting the demands of a certain situation, and that these situations are a threat to the individual's health.

Aldwin (1994) considers that stress refers to the experience created as a result of the interaction of the individual and the work environment. This interaction may lead to psychological and physiological tension. Selye (1964) defines stress as the natural degeneration of the body and as the non-specific response of the body to any demand

placed upon it. He himself recognised the meaning of **positive stress**, which not only does not cause degeneration and malfunctions, but can also act as a productive factor and as a factor of development and creation.

Karasek (1979) proposed a theoretical model, where the basic factors that cause stress to the employee are three:

a. The work or project the employee is called to put into effect in itself.

b. The limits of initiative taken by the employee, the independence and the margins of control he/she has in the job.

c. Social relations with seniors, colleagues and subordinates.

The existence of just one of these three factors is not enough to create stress. All three together, however, definitely affect the employee.

Warr (1990) considers that each of Karasek's work factors must exist at an appropriate analogy so as not to create stress. As stressful as not having much initiative margin may be, extremely large margins are equally stressful. According to Warr, the basic factors burdening stress are decision-making and the development of knowledge, abilities and experiences, satisfactory remuneration, working duties that are interesting and varied, precise roles, physical safety, tangible targets, social recognition and the potential for interpersonal communication.

According to Siegrist (1996), there must be a balance between what employees "invest" in the job and what they get back. In opposite cases, they feel oppressed and dissatisfied. The term effort contains two dimensions, exogenous and endogenous. The former concerns the effort that the employees make in order to fulfil their working duties, while the latter concerns the internal motives that urge them to perform (e.g. the need for

social recognition, etc.). As reciprocation, employees get financial remuneration from the job, the potential to sustain or upgrade their working position, expectation satisfaction, security etc.

There are many theories that have dealt with satisfaction; some of them are in the same lines while others differ greatly from each other. Initially, Maslow (1954) supported the anthropocentric function of organisations, with the existence of a hierarchy of various need forms. Initially we have **physiological** needs, which are clearly biological, such as food, clothing, accommodation etc. These constitute the base for the individual to move on to the satisfaction of psychological needs. When physical needs are satisfied, then the needs of **safety** or certainty arise. These include the need for stability, protection from dangers, and provision for the future.

A number of researchers have found a connection between intention to leave one's job and job dissatisfaction (Heslop *et al*, 2002; Brief and Weiss, 2002; Clugston, 2000). Halpern (1999) claims that employee turnover caused by job dissatisfaction has caused company costs in terms of recruitment, selection and training new employees. Researchers have also studied job satisfaction in a wide range of professions like industrial teacher educators (Brewer and McMahan-Landers, 2003 a,b), teachers (Bogler, 2002), physicians (Bergus *et al.,* 2001), customer service employees (Carless, 2004), student support personnel (Brewer and Clippard, 2002), youth development organizations (Petty *et al.*, 2005) and management of healthcare workforce (Labiris *et al.,* 2008).

When safety needs are satisfied, then social needs arise. As a social being, the individual needs to belong in groups, to have loving relationships with other individuals, friendships, etc. Estimation needs constitute a development of social needs, because here

the individual does not only desire to belong to a group, but also to be recognised, appreciated and respected by others. The satisfaction of these needs creates self-confidence, power and prestige. Finally, there is the need for self-realisation that is the need for maximising potential towards higher forms of action. The desire is to become what somebody can become, and this state, of completion, is reached by few people.

Alderfer (1972) amended Maslow's theory and supported that if for some reason the individual cannot satisfy his/her needs on a higher level, then he/she returns to the needs of a lower level that are already satisfied. Through his ERG theory (Existence, Relatedness, and Growth), Alberfer sorted the needs into three categories:

α) Existence (here we find Maslow's physical and safety needs),

β) Relatedness (Maslow's social needs),

γ) Growth (Marlow's estimation and self-realisation needs).

Finally we must mention Herzberg's (1966) theory in passing, as we believe that it constituted the base for the development of several theories. In Herzberg's theory we find two different kinds of factors, motivators and hygiene factors, which are related to work satisfaction. According to Herzberg, positive stances towards work which lead to satisfaction are related to the work content, e.g. achievement, recognition, responsibility, development potential, and the nature of the work. These factors were named motivators as they contribute to the urging of the individual towards greater performance and effort.

On the other hand, negative stances that lead to dissatisfaction are connected to the framework of the organisation, such as management, supervision, remuneration, interpersonal relationships. These factors were named hygiene factors, as they contribute

to the prevention of work dissatisfaction, while their effect on the creation of positive feelings is very limited.

With reference to the relationship of satisfaction with productivity and based on the assumption that there is a relationship, Porter and Lawler (1986) created a model in order to examine the matter of activation. The model is based on the assumption that rewards create satisfaction and that some times performance leads to remuneration of various kinds, which create satisfaction in workers. Thus, productivity is related to satisfaction through the notion of rewards and therefore comes into contrast with the neo-classical approach, which considered satisfaction a cause and prerequisite for good performance. There are many factors that lead to the view that the satisfied worker is not necessarily a productive one.

Locke (1976) considers that the relationship between satisfaction and productivity is reciprocal. It is not, thus, satisfaction that leads to productivity, but productivity that leads to satisfaction. Then, satisfaction affects productivity mainly in an indirect way, creating a feeling of dedication towards the organisation and its targets. Beyond this relationship of productivity-satisfaction-productivity, it is possible to have a secondary increase of satisfaction, provided that productivity results in the increase of other remunerations related to work (promotion, authority, bonus, etc) that contribute to the increase of satisfaction.

Finally, with the development of new technologies and the globalization of economic growth a number of changes in the labour market have been experienced with either relatively advantaged and stable employment or uncertain employment characterized by volatility and low salaries (Ferrie *et al*., 1999; Paoli, 1997). Structural

unemployment, underemployment and early retirements have increased and continue to increase leading to increased stress, job insecurity and lower job satisfaction.

3. Data and proposed methodologies

3.1 The questionnaire

In our study, apart from stress and satisfaction levels that interest us, we made an effort to collect information concerning the parameters related to these elements, either separately or as a whole. A number of variables were considered such as the socio-economic (age, marital status, income, sex) and other qualitative (that give non-numerical information) variables like "creativity within the organization", "labour accountability", "higher rewards" and the level of education.

Relying on the existing literature a new questionnaire was developed and was first tried in 20 employees (around 5% of the final sample). A number of modifications were made before the final version. Testing the reliability of our instrument a Cronbach Alpha coefficient of 0.92 was estimated. This coefficient shows how all the statements of the questionnaire relate to one another in content.

The data collection was performed in a month time and solely by means of personal interviews. Participants replied to a number of statements using a 5-point Likert scale with 1 corresponding to "very little" and 5 to very much". In case of negative statements we had to reverse the scores with the value of 1 corresponding to "very much" and the value of 5 corresponding to "very little". The ones that answered at the extreme ends (¨very little¨ or ¨little¨) seem not to consider important the effect of changes on productivity, whereas the ones that answered ¨not much´, ¨very´ and ¨very much¨ seem to

consider the effect as important. The ones that did not reply were excluded from the analysis of the sample.

3.2 The adopted methodology

In order to analyse the relationship between stress, satisfaction and productivity, we performed a study on a random sample of 425 individuals. The population of our study consists of employees working in private enterprises and public organisations from throughout the country (excluding non-profit organizations). A list of all companies operating in Greece was provided by ICAP and this list was our sampling frame. The entire population was used in order the sample to be representative, random and as large as possible (Gay and Airasian, 2003).

Specifically, our sample initially contained primary units and then through them secondary units was selected. Our work was based on the method of two-stage cluster sampling and not on a single stage sampling, such as random, systematic or stratified. Cluster sampling requires the division of the population into groups of elements/clusters in such a way as each element to belong to one and only one cluster. We preferred cluster sampling instead of stratified as the former tends to provide better results when the elements within the cluster are heterogeneous. We have adopted a two stage cluster sampling and developed first a frame consisting of all employees in private and public sectors in middle and high positions. We have selected first with the use of random numbers a random sample of 94 companies and then a random sample from each of the 94 sampled clusters.

Factor analysis is used first to group the variables (see table 1) into main factors according to their impact similarity and avoiding the problem of multicollinearity. The idea to perform a Factor Analysis came from the fact that some variables are expected to present an increased correlation as a result of overlapping variation between them. That would result in multicollinearity in a multiple regression model setup. Researchers suggest the application of factor analysis in order to examine the structure of the overlapping variation between the predictors (Leeflang *et al.*, 2000) claiming that the only problem in this case remains the theoretical interpretation of the final components (Greene, 2000; Gurmu, *et al*, 1999).

Specifically referring to the factor model, the factor scores are calculated as

$$\hat{F} = X\hat{B}$$

where $\hat{F}$ is an mxn matrix of m factor scores for n indicators, X is an nxp matrix of observed variables and $\hat{B}$ is a pxm matrix of estimated factor score coefficients. In the Principal Components method applied here for the extraction of the factors the scores are exactly calculated. Residuals are computed between observed and reproduced correlations.

If the common factors F and the specific factors u can be assumed normally distributed, then maximum likelihood estimates of the factor loadings and specific variances may be obtained. In our case we have followed the varimax rotation. The objective of this rotation is to determine the transformation matrix in such a way as any given factor will have some variables loaded high on it and some loaded low on it. This may be achieved by maximizing the variance of the square loading across variables

subject to the constraint that the communalities of each variable remain the same (Johnson and Wichern, 1998; Sharma, 1996).

Next a regression analysis between the dependent variable and extracted factors is performed. This is not new. Dunteman (1989) also suggests this process to cope with multicollinearity in a regression analysis model and it is also an indicated way to minimize the number of independent variables and maximize the degrees of freedom.

After presenting the basic variables and the corresponding answers of the interviewees, we will proceed with the sampling of the effect of changes to productivity based on those variables. More specifically as a dependent variable will use the effect of stress and satisfaction to productivity. As independent variables were considered the socio-economic as well as various other qualitative variables mentioned above. Various dummy variables were constructed in relation to the ranking within the organization (employee, supervisor, manager) as well as the impact on productivity based on different age groups. Those variables were used in a logistic regression.

The method was preferred from the multiple regression as the dependent variable is dichotomous and discontinued. Additionally the logistic regression is the more appropriate monotonic function for the sample of gathered data compared to the criterion of least squares of a multiple regression. Also the logistic regression was preferred from a discriminant analysis since the latter is based on the hypothesis of the multivariate normality and the equal variance-covariance matrices across teams. Those hypotheses are not required in the logistic regression[1].

[1] For more details about applications of logistic regression see Halkos (2007).

As our main interest is in terms of the main effects we have ignored interactions. Working with the two factors extracted the logit form of the fitted model may be represented as

$$\text{logit } [Pr(Y=1)] = \beta_0 + \beta_1 \text{ Factor 1} + \beta_2 \text{ Factor 2} + \varepsilon_{1t}$$

where Y denotes the dependent variable as 1 for significant influence of stress and satisfaction on productivity and 0 for insignificant effect.

Apart from the model formulation using the extracted factors we propose three other formulations modeling productivity and socioeconomic variables, stress and satisfaction. Specifically, the first formulation concerns a number of socioeconomic variables like

$$\text{Logit } [Pr(Y=1)] = \gamma_0 + \gamma_1 \text{ Age} + \gamma_2 \text{ Education Level} + \gamma_3 \text{ Work Experience} +$$

$$+ \gamma_4 \text{ Distance} + \gamma_5 \text{ Sector} + \gamma_6 \text{ Position} + \varepsilon_{2t}$$

The other two formulations refer to modelling productivity and stress and satisfaction respectively. That is,

$$\text{Logit } [Pr(Y=1)] = \delta_0 + \delta_1 \text{ Hurried} + \delta_2 \text{ Low Quality} + \delta_3 \text{ Effects in Private Life} + \varepsilon_{3t}$$

$$\text{Logit } [Pr(Y=1)] = \zeta_0 + \zeta_1 \text{ Job Satisfaction via Education} + \zeta_2 \text{ Job Satisfaction via Rightness} + \zeta_3 \text{ Job Satisfaction via Qualification} + \zeta_4 \text{ Job Satisfaction via Organization} + \varepsilon_{4t}$$

Where ε_{it} the disturbance terms and β_i, γ_i, δ_i, ζ_i the parameter estimates.[2]

[2] We have tried to mix variables of the proposed models but we couldn't end up with a meaningful model.

4. Empirical Results

Going on to our statistical analysis, Table 1 presents factor loadings and specific variance contributions according to Maximum Likelihood method of extraction in a Factor Analysis setup. Looking at Table 1 it can be seen that the first 18 questions define factor 1 (high loadings on factor 1, small or negligible loadings on factor 2) and represent **stress**. The questions refer among others to stress from work to personal life and stress from a number of cases like work environment, lack of creativity, surrounding work relations, chances of evolution, change management, management policy etc. Similarly the other 14 questions define factor 2 (high loadings on factor 2, small or negligible loadings on factor 1), which represents **satisfaction**. The questions refer among others to satisfaction from work role, work environment, personal work method, surrounding work relations, utilization of knowledge-capabilities, salary etc.

The communalities being high indicate that the two factors account for a large percentage of the sample variance of each variable and is evidence that the model presents stability. From the same table the KMO index is close to unit (0,860) which implies that the sum of squares of the partial correlation coefficients between all the pairs of variables is low. This result shows that in our case factor analysis is strong. Similarly, the value of the Bartlett's test of sphericity is very large (5.560,3) and the level of statistical significance is 0,000 leading to the rejection of the null hypothesis that the matrix of correlation coefficients is unity.

Table 1: Factor analysis results

	Component Matrix		Rotated Component Matrix		Commu-nalities
Variables	*Factor 1*	*Factor 2*	*Factor 1*	*Factor 2*	
work can create difficulties in personal life	0,381	3,686E-02	0.350	-0.155	0.146
work stressors can affect the rest	0,497	0,118	0.491	-0.141	0.261
workload upsets people	0,450	0,293	0.536	3.469E-02	0.289
stress from transfer to or from work	0,395	0,176	0.431	-4.02E-02	0.187
stress from the work environment	0,390	0,105	0.391	-9.96E-02	0.163
stress about work hours	0,508	0,288	0.584	1.620E-03	0.341
stress about job security	0,441	0,218	0.491	-2.61E-02	0.242
stress from cooperation-communication with others	0,593	0,280	0.654	-4.67E-02	0.430
stress from lack of creativity	0,689	0,279	0.738	-9.47E-02	0.553
stress about chance further education	0,528	0,246	0.581	-4.47E-02	0.339
stress about personal work method	0,547	0,257	0.602	-4.44E-02	0.365
stress surrounding work relations	0,545	0,376	0.660	6.075E-02	0.439
stress about salary	0,569	0,175	0.582	-0.126	0.354
stress about utilization of Knowledge - capabilities	0,629	0,242	0.667	-9.78E-02	0.455
stress about relations with management-leadership	0,704	0,236	0.729	-0.140	0.552
stress about chances of evolution	0,590	0,239	0.631	-8.07E-02	0.405
stress about management policy	0,700	0,212	0.714	-0.158	0.534
stress about change management	0,532	0,251	0.587	-4.26E-02	0.346
satisfaction from the organization	0,429	-0,343	0.205	-0.509	0.302
satisfaction from work role	0,362	-0,420	0.109	-0.544	0.308
satisfaction from the work environment	-0,266	0,311	-7.96E-02	0.402	0.168
satisfaction from cooperation-communication with others	-0,439	0,278	-0.246	0.457	0.270
satisfaction from lack of creativity	-0,353	0,633	2.665E-03	0.725	0.526
satisfaction about chance further education	-0,305	0,489	-2.58E-02	0.576	0.332
satisfaction about personal work method	-0,344	0,508	-5.11E-02	0.611	0.376
satisfaction surrounding work relations	-0,216	0,116	-0.131	0.207	5.999E-02
satisfaction about salary	-0,437	0,446	-0.162	0.603	0.389
satisfaction about of utilization Knowledge – capabilities	-0,445	0,699	-4.53E-02	0.827	0.687
satisfaction about relations with management-leadership	-0,417	0,485	-0.125	0.627	0.409
satisfaction about chances of evolution	-0,366	0,586	-3.13E-02	0.690	0.478
satisfaction about management policy	-0,384	0,535	-7.21E-02	0.654	0.433
satisfaction about change management	-0,100	0,262	4.098E-02	0.277	7.846E-02
Cumulative Proportion of Total sample Variance Explained	65,6		63,3		63.3
KMO	0,860				
Bartlett's test of Sphericity	5.560,3	(Sig.=0.000)			

The results of the fitted logistic models are presented in Table 2. The individual statistical significance of the β estimates is presented by the Wald (Chi-square). The significance levels of the individual statistical tests (i.e. the P-values) are presented in parentheses and correspond to Pr>Chi-square.

In the model formulation using the extracted factors as explanatory variables we have statistical significance for both factors. In the case of using the socioeconomic variables as independent we see that the variable distance is statistically significant in all levels of significance. Similarly, the variables work experience and educational level are statistically significant for the levels of 0.05 and 0.1 and the variables work experience and sector for 0.1. The variable position is statistically insignificant. In the case of the model with the proposed variables representing stress we see that the variables low quality and hurried are statistically significant for the levels of 0.05 and 0.1 and the variable effect in private life for 0.1. Finally, in the case of the model with the proposed variables representing satisfaction we see that the variables job satisfaction via rightness and qualifications are statistically significant in all levels of significance while the variable job satisfaction via education for the level of 0.1. The variable job satisfaction via organization is statistically insignificant.

Being more specific, in case we run the model with the socioeconomic variables then the coefficient of age is $\hat{\beta}_1$=-0.636, which implies that the relative risk of this particular variable is $e^{\hat{\beta}_1}$=0.529 and the corresponding percentage change is $e^{\hat{\beta}_1}$-1=-0.471. This means that in relation to age the odds of persons' ability to increase productivity decreases by almost 47% ceteris paribus. In the case of work experience $\hat{\beta}_2$=-0.229, which implies that the relative risk of this particular variable is $e^{\hat{\beta}_2}$=1.349 and the corresponding percentage change is $e^{\hat{\beta}_2}$-1= 0.349. This means that in relation to work experience the odds of persons' ability to increase productivity increases by almost 0.35% all other remaining fixed. Similarly, the odds of persons' ability to increase

productivity decreases by 0.55, 0.29, 0.51 and 0.113 in relation to distance from work, education level, sector of employment and position respectively.

We may compute the difference $e^{\hat{\beta}_i} - 1$ which estimates the percentage change (increase or decrease) in the odds $\pi = \frac{\Pr(Y=1)}{\Pr(Y=0)}$ for every 1 unit in X_i holding all the other X's fixed. In case we run the model with the productivity against the stress statistically significant variables then the coefficient of someone hurried is $\hat{\beta}_1$=0.387, which implies that the relative risk of this particular variable is $e^{\hat{\beta}_1}$=1.473 and the corresponding percentage change is $e^{\hat{\beta}_1}$-1=0.473. This means that in relation to stress expressed by hurries the odds of persons' ability to increase productivity increase by almost 47% ceteris paribus. In the case of low quality in the work produced $\hat{\beta}_2$=0.483, which implies that the relative risk of this particular variable is $e^{\hat{\beta}_2}$=1.621 and the corresponding percentage change is $e^{\hat{\beta}_2}$-1= 0.621. This means that in relation to low quality in production the odds of persons' ability to increase productivity increases by almost 0.62% all other remaining fixed. Finally, the odds of persons' ability to increase productivity decreases by 0.243 in relation to effects in private life all other remain fixed.

In case we run the last model with the productivity against satisfaction statistically significant variables then the coefficient job satisfaction via education $\hat{\beta}_1$=0.617, which implies that the relative risk of this particular variable is $e^{\hat{\beta}_1}$=1.853 and the corresponding percentage change is $e^{\hat{\beta}_1}$-1=0.853. This means that in relation to job satisfaction via education the odds of persons' ability to increase productivity increase by almost 85% ceteris paribus. In the case of job satisfaction via rightness $\hat{\beta}_2$=1.130, which implies that

the relative risk of this particular variable is $e^{\bar{\beta}_2}$ =3.095 and the corresponding percentage change is $e^{\hat{\beta}_2}$ -1= 2.095. This means that in relation to job satisfaction via education the odds of persons' ability to increase productivity increases by almost 210% all other remaining fixed. Finally, the odds of persons' ability to increase productivity increases by 375% and decreases by 0.28% in relation to job satisfaction via qualification and organizations respectively.

The Nagelkerke R square is a measure of predictability of the proposed models (similar to R^2 in a regression). To assess the model fit we compare the log likelihood statistic (-2 log $\hat{L}$) for the fitted model with the explanatory variables with this value that corresponds to the reduced model (the one only with intercept). The likelihood ratio statistic is quite high in all cases rejecting H_0 and concluding that at least one of the β coefficients is different from zero.

Finally, the Hosmer and Lemeshow values equal to 4.48, 5.73, 9.85 and 0.92 (with significance equal to 0.812, 0.677, 0.276 and 0.969) for the four model formulations respectively. The non-significant X^2 value indicates a good model fit in the correspondence of the actual and predicted values of the dependent variable.

Table 2: The logistic regression results

Variables	**Estimates**	**Odds Ratio**	**Estimates**	**Odds Ratio**	**Estimates**	**Odds Ratio**	**Estimates**	**Odds Ratio**
Constant Wald P-value	1.521 [100.8] (0.000)		7.231 [22.476] (0.000)		0.537 [0.301] (0.583)		-2.211 [36.973] (0.000)	
Factor 1 (stress) Wald P-value	-0.392 [7.596] (0.006)	0.676						
Factor 2 (satisfaction) Wald P-value	0.442 [10.616] (0.001)	1.556						
Age Wald P-value			-0.636 [5.529] (0.019)	0.529				
Work experience Wald P-value			-0.299 [3.128] (0.077)	1.349				
Distance Wald P-value			-0.803 [24.511] (0.000)	0.448				
Education level Wald P-value			-0.349 [4.057] (0.044)	0.705				
Sector Wald P-value			-0.720 [2.998] (0.083)	0.487				
Position Wald P-value			-0.120 [1.680] (0.195)	0.887				
Hurried Wald P-value					0.387 [4.999] (0.025)	1.473		
Low quality Wald P-value					0.483 [4.558] (0.033)	1.621		
Effect in private life Wald P-value					-0.278 [2.815] (0.093)	0.757		
Job-satisfaction via education Wald P-value							0.617 [2.751] (0.097)	1.853
Job-satisfaction via rightness Wald P-value							1.130 [13.45] (0.000)	3.095
Job-satisfaction via qualifications Wald P-value							1.557 [24.13] (0.000)	4.745
Job-satisfaction via organization Wald P-value							-0.333 [0.924] (0.336)	0.717
Nagelkerke R^2	0.1		0.16		0.1		0.34	
Hosmer Lemeshow	4.478 (0.812)		5.731 (0.677)		9.850 (0.276)		0.922 (0.969)	
Likelihood Ratio	331.357		225.26		246.79		393.904	

5. Conclusions and Policy Implications

In this paper we used factor analysis in order to identify the responsible factors for the correlation among a large number of variables and their influence on productivity. Our results showed us that productivity is seriously affected by the two qualitative factors, stress and satisfaction. As expected, in the former, increased stress leads to reduced productivity and in the latter, increased satisfaction leads to increased productivity.

Following this, logistic regression presented us with a lot of useful elements concerning the function of stress, satisfaction and supportive elements on productivity. Initially it showed us the effect of financial and social elements such as the importance of experience and previous employment on productivity, but also the importance of the knowledge that an employee will continue to work for the same organisation, since the increase of productivity in employees of the same organisation was considerably high. Thus, the trust in older members of staff is a point that can offer a considerable advantage to the organisation and also a feeling of safety to the employee.

Another element that arose was the everyday ordeal concerning getting to and from work with this element having a negative effect on employees' productivity. A problem of decreased productivity also arose in the case of the public sector, which may be true, but at the same time this is connected with lack of motivation, meritocracy, satisfaction etc. Then the influence of stress on productivity was accentuated, focused on three elements. First, when work starts to intersect with the workers' personal life, this has a negative effect on productivity. Second, work load is not connected to the lack of quality in everyday work, thus quality work is more related to conscientiousness and

personal satisfaction than work load. And third, energetic and active individuals do not affect productivity negatively, but positively, and this is why we mentioned the case of creative and "useful" stress.

The satisfaction factor greatly affects productivity according to our empirical findings. It is important for individuals to work on what they wanted and chose in their lives, and this is why a large increase in productivity is evident from this element. It is more important, however, to have a balance between employees' qualifications and their contribution to the organization and the benefits (of all kinds) offered by the organisation to the employees.

Relying on our sample, we could mention some interesting points. The age and family status of the employees is a particularly important factor relating to satisfaction, because as age increases, the satisfaction from work is reduced, while the younger the age, the higher the ambition. In the same way, those who do not have children or are not married find greater pleasure in work with respect to their free time. With reference to financial situation and education level, we found that workers with high incomes and those with higher education are more ambitious than other categories. Work experience and in particular years of work for the same organisation are a stress-reducing factor, since mutual trust between organisation and employee contributes to this respect. With respect to stress and satisfaction, we saw that a large percent of workers shows stress, but also feels satisfaction from the same organisation. It is noteworthy that the satisfaction ratio is smaller around systems of remuneration and benefits, and so injustices in the remuneration-benefit systems of an organisation may cause considerable problems.

Necessary steps

Relying on our empirical results a number of steps are necessary. In particular,

1. A clear job description is needed in order to avoid phenomena of vagueness in roles, fields of action, or role conflicts.
2. Rotation of employees, even horizontally, so that they do not reach points where their work is monotonous and boring.
3. Change of work areas, if the initial design was not correct or if the introduction of changes and re-classifications leads to a recasting of the work area (e.g. the company used to have two employees in the accounts department, but due to development the same space must now accommodate four people).
4. Creation of an environment of understanding and acceptance of such problems by the company, so that the employee knows that it cares for him and that he is an integral part of the organisation.
5. Constant informing and training of the employees, not only on matters concerning their work but also on more general matters concerning the functioning and activities of an organisation (e.g. seminars on group work, time management, stress management etc.).
6. The existence of recognition and reward for each work achievement contributes towards the keeping up of the employees' morale; in this way, employees adopt a positive mood towards their role in the organisation, and the organisation shows its members that it does not regard them only as performers, thus creating a better working climate and reducing the feeling of insecurity and stress. Positive working conditions are considered necessary and non-negotiable factors. Each working area,

but also the broader environment of the organisation, create moods, contribute towards behaviours and lead to stances.

7. Work security and the feeling that employees are not in danger (of remaining unpaid, being fired, being demoted) are important factors. The same applies for control and supervision, provided, however, it is based on contribution towards better and more just work attainment and greater group effectiveness, and not on fear of reproach or penalty.
8. Greater independent action, so that employees can bring out and channel their potential.
9. Better and more substantial operation of the team.
10. Creation of a Motivator framework which will be renewed and adjusted according to needs.
11. Impulse from management for greater creativity and innovation.
12. Cooperation of management and workers, based on a mutual profitable development of the people and the organisation.

Relying on the findings of our survey we have to admit that generalizations to other populations must be done carefully. Additional research should focus on the ways to increase productivity in public sectors where hearing of an action is difficult to use and hard to move. The effect of stress and satisfaction on productivity in specific sectors or geographical areas or professions should also be explored. Finally, more qualitative factors affecting productivity may be explored like emotional intelligence.

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